

MERRA

Performance: Clouds & Radiative Forcing

5 September, 2006

MERRA

Requirement to justify proceeding -- advance upon ERA-40

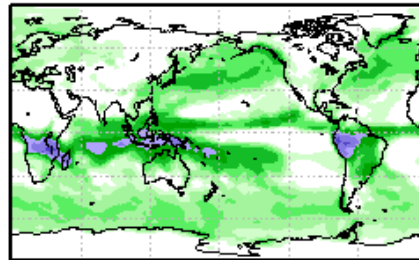
- Improved treatment of changing observing system
 - SSMI jump evident in other reanalyses has to be reduced
 - Strategy: retrospective bias correction through the model for MERRA
- Improved Hydrological cycle
 - ✓ Minor tuning remains but Tropical Precipitation and TPW already an improvement on era-40
 - ✓ Improved cloud-radiation interaction and surface/TOA radiative budgets
 - Improve monsoon precipitation
 - Is vertical distribution of moisture good enough?
 - Can we use precipitation data more effectively?
- Surface
 - Surface temperature has warm bias (currently no surface analysis)
- ✓ Improved stratospheric analysis
 - ✓ fully resolved middle atmosphere - an advance on era-40
 - ✓ fully interactive ozone - an advance on era-40
 - ✓ stratospheric transport less noisy than era-40

2° MERRA tests

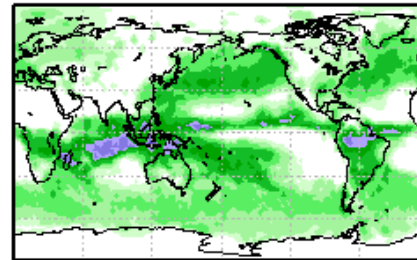
January 2001 Precipitation (mm/day)

MERRA_v0

MERRA RPSW: Mean:2.29138 Std: 3.42681

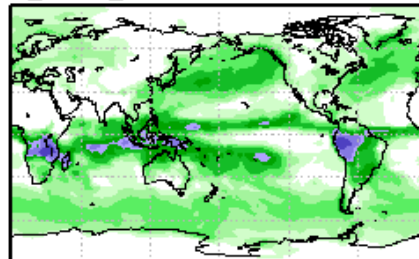


CMAP: Mean:2.63544 Std: 3.2458

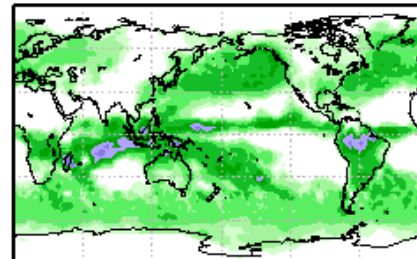


MERRA_v1

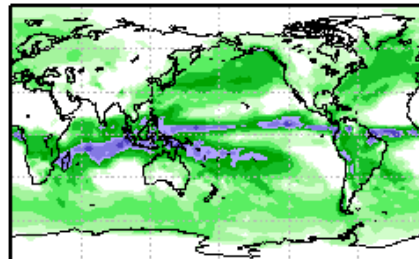
b500_dwndft_01: Mean:2.59747 Std: 3.63984



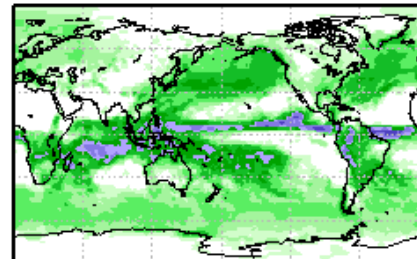
GPCP: Mean:2.56721 Std: 2.95886



ERA-40: Mean:3.35142 Std: 4.90169

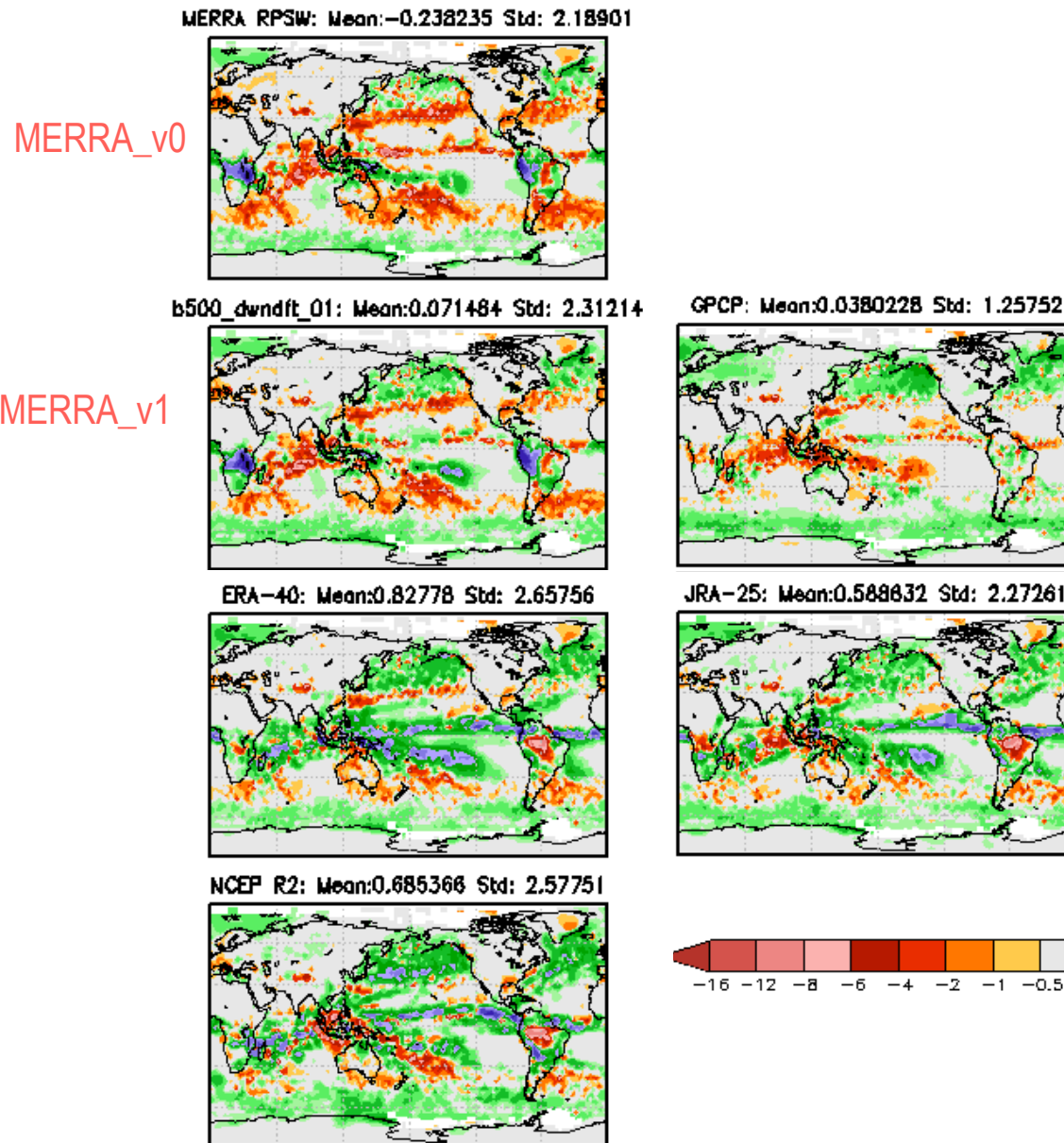


JRA-25: Mean:3.11313 Std: 3.95434



2° MERRA tests

January 2001 Precipitation - CMAP (mm/day)

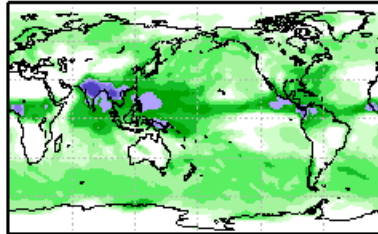


2° MERRA tests

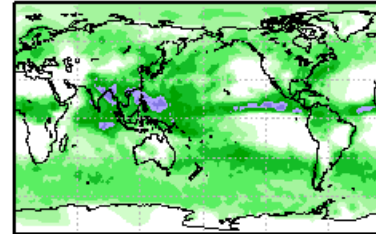
July 2001 Precipitation (mm/day)

MERRA_v0

MERRA RPSW: Mean:2.68435 Std: 3.68868

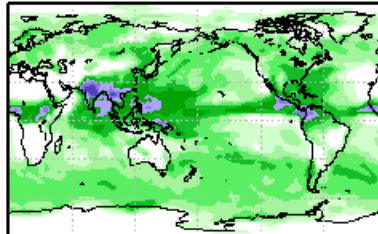


CMAP: Mean:2.77003 Std: 3.00925

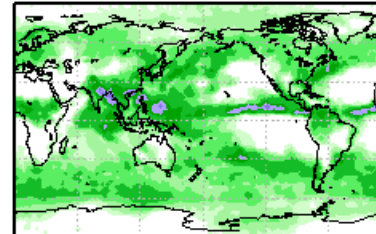


MERRA_v1

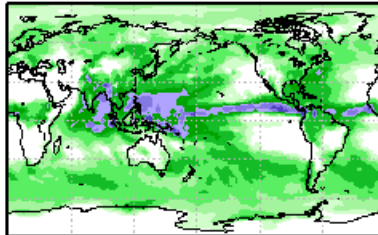
b500_dwndft_01: Mean:2.85346 Std: 3.39682



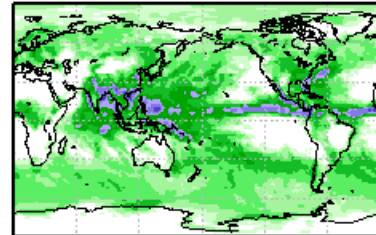
GPCP: Mean:2.66688 Std: 2.79423



ERA-40: Mean:3.49985 Std: 4.41209

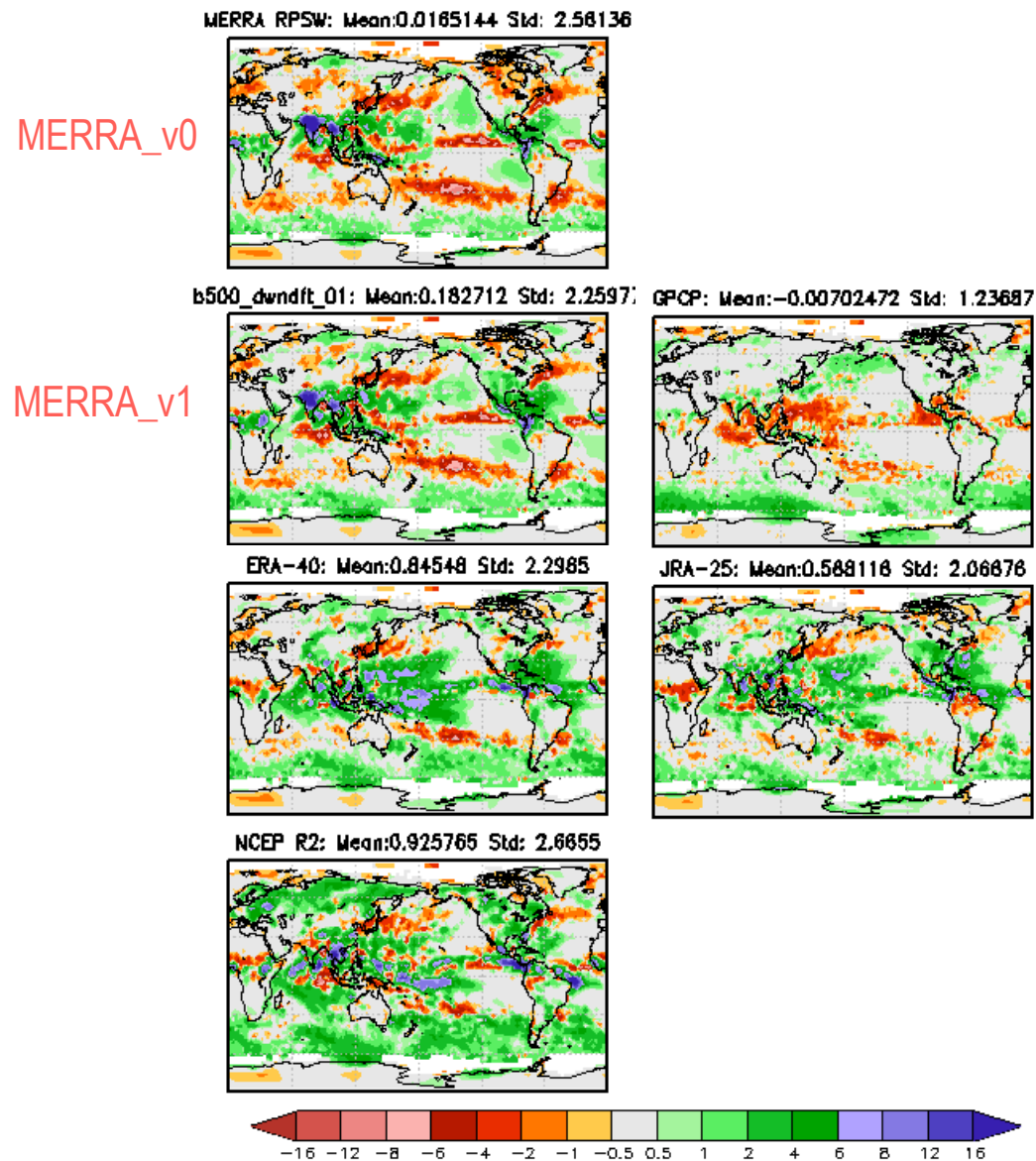


JRA-25: Mean:3.23156 Std: 3.65796



2° MERRA tests

July 2001 Precipitation - CMAP (mm/day)

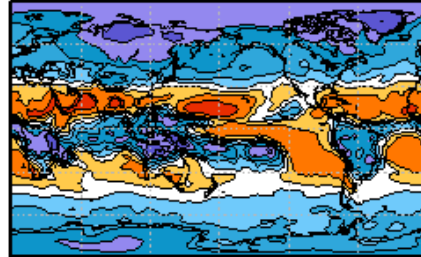


2° MERRA tests

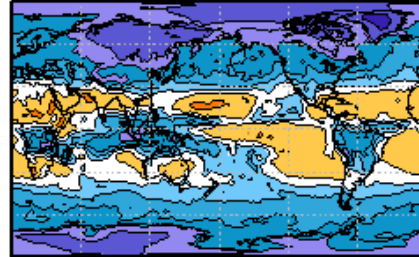
January 2001 OLR (Wm^{-2})

MERRA_v0

MERRA RPSW: Mean:235.051 Std: 39.5689

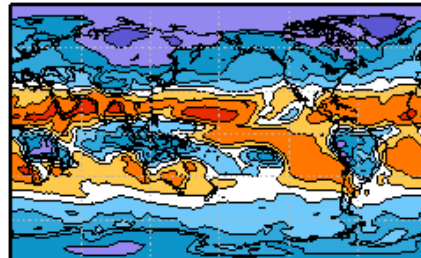


NOAA OLR: Mean:225.23 Std: 34.7597

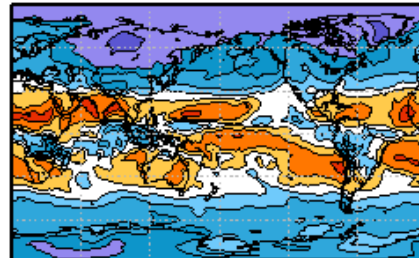


MERRA_v1

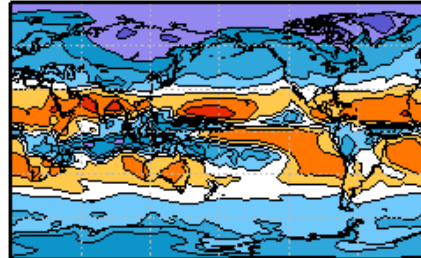
b500_dwndft_01: Mean:241.772 Std: 37.3575



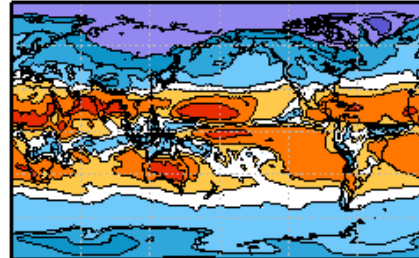
NCEP R2: Mean:240.08 Std: 35.8779



ERA-40: Mean:241.504 Std: 34.1689

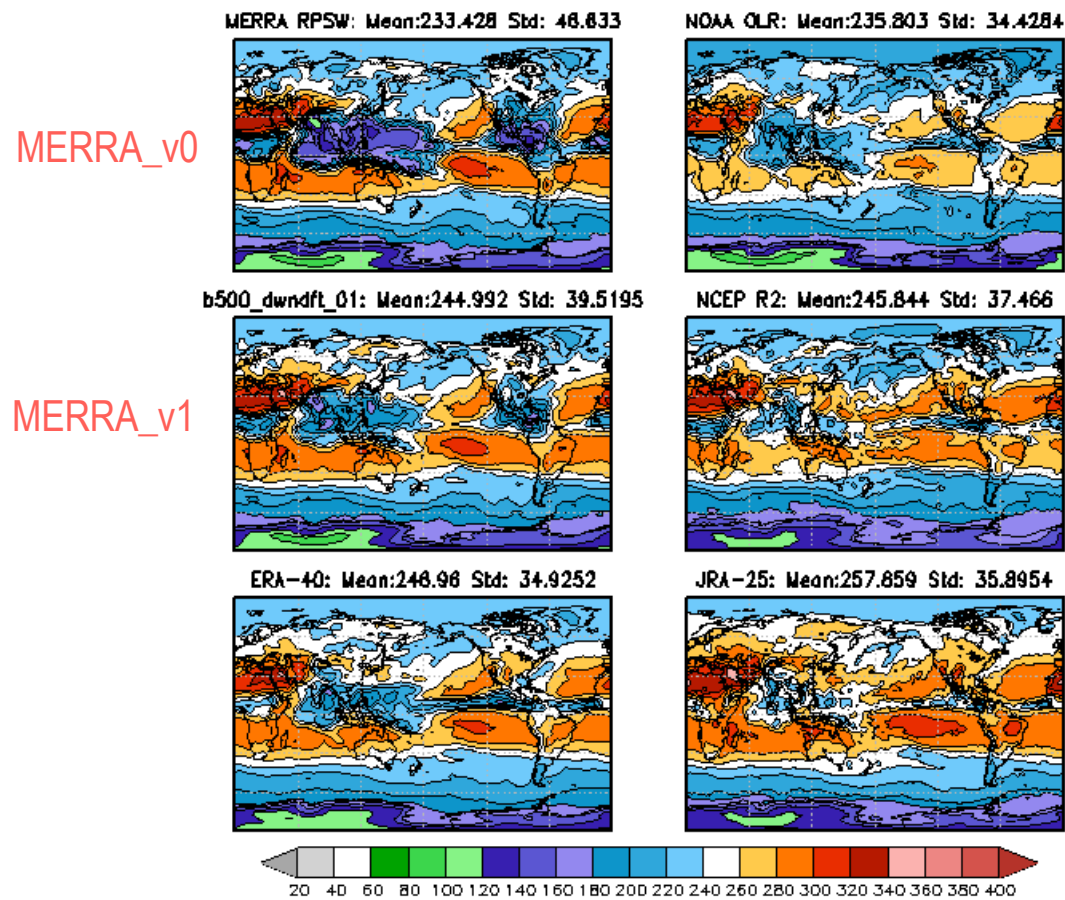


JRA-25: Mean:251.847 Std: 34.4392



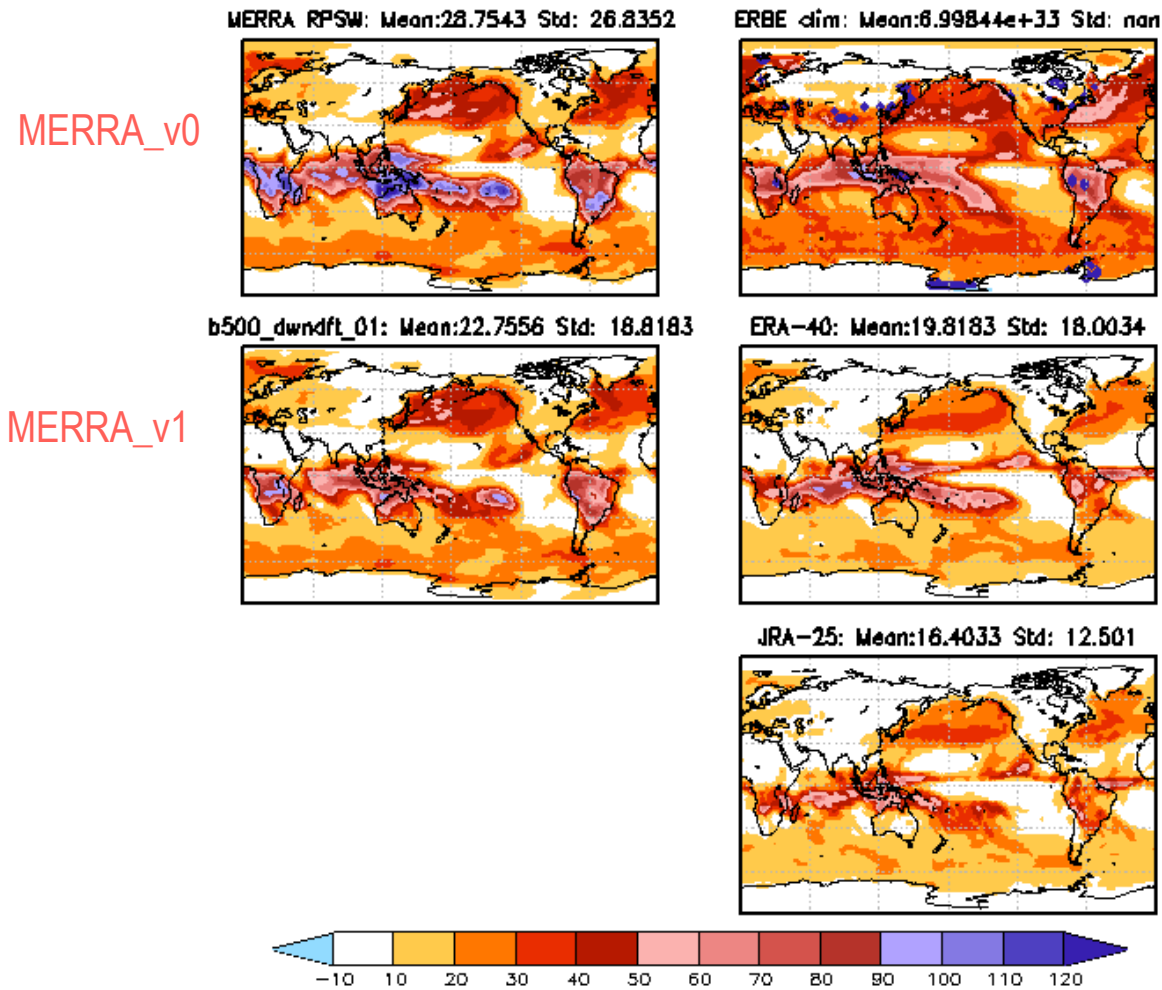
2° MERRA tests

July 2001 OLR (Wm^{-2})



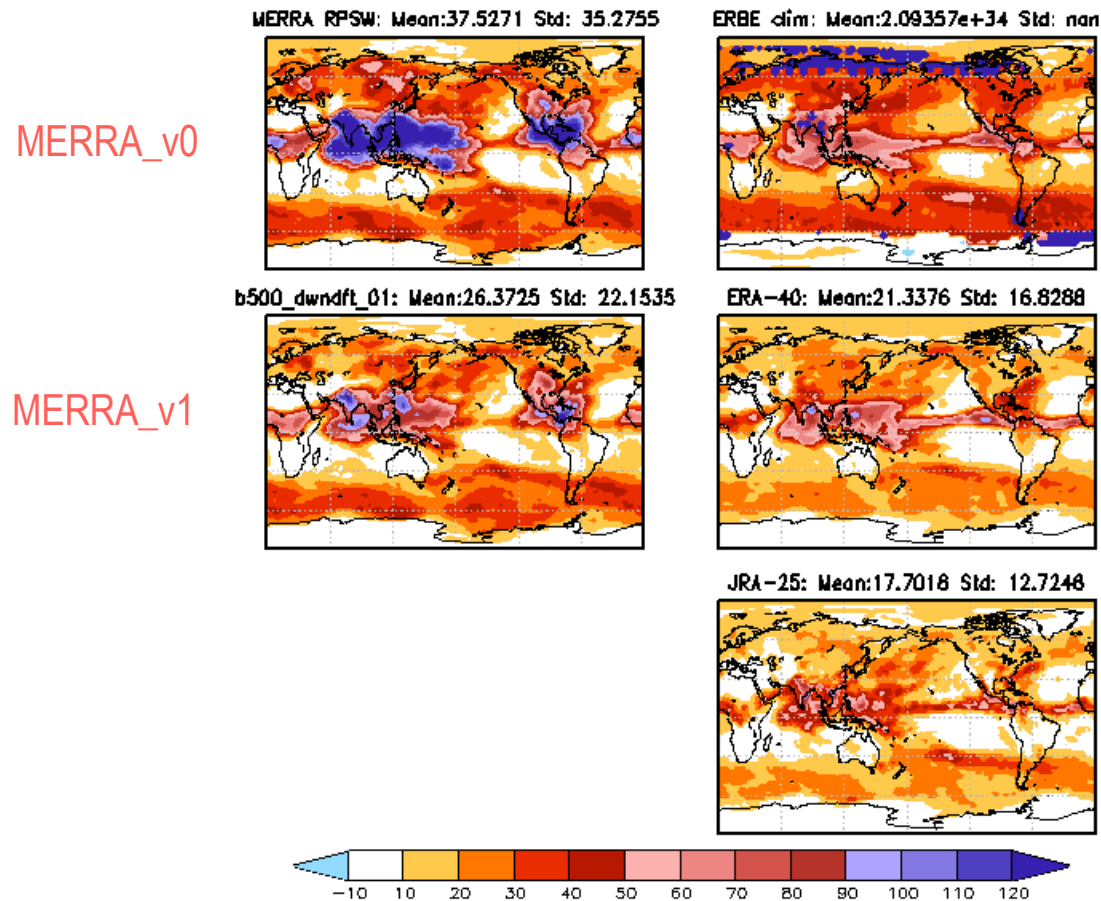
2° MERRA tests

January 2001 LW CRF (Wm^{-2})



2° MERRA tests

July 2001 LW CRF (Wm^{-2})

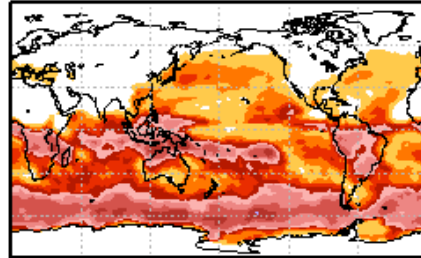


2° MERRA tests

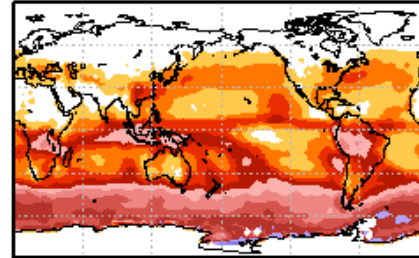
January 2001 SW CRF (Wm^{-2})

MERRA_v0

MERRA RPSW: Mean:55.7023 Std: 46.6719

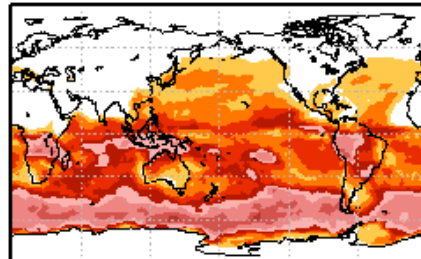


ERBE clim: Mean:-1.25132e+34 Std: nan

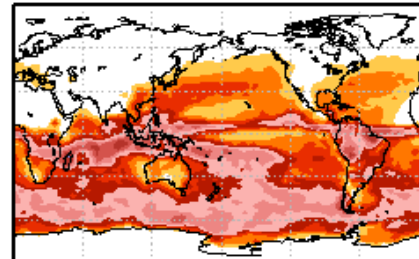


MERRA_v1

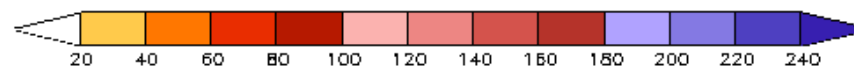
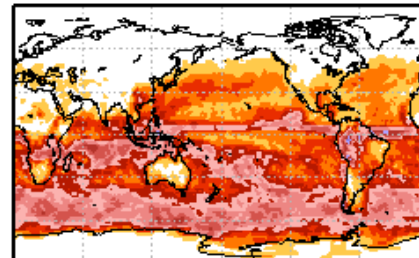
b500_dwndft_01: Mean:51.5345 Std: 40.9919



ERA-40: Mean:60.1656 Std: 43.9887



JRA-25: Mean:60.9177 Std: 43.0473

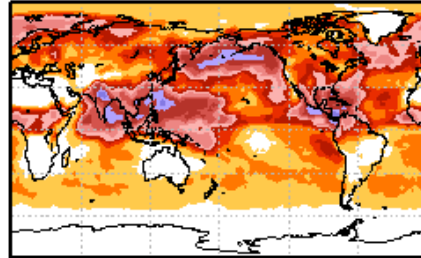


2° MERRA tests

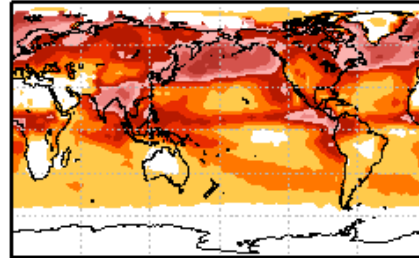
July 2001 SW CRF (Wm^{-2})

MERRA_v0

MERRA RPSW: Mean:57.7809 Std: 48.3868

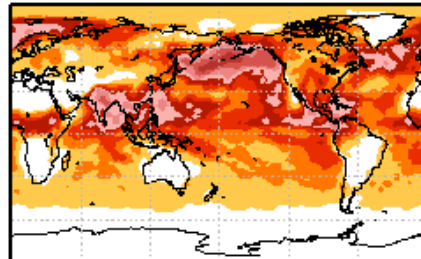


ERBE clim: Mean:-4.05282e+34 Std: nan

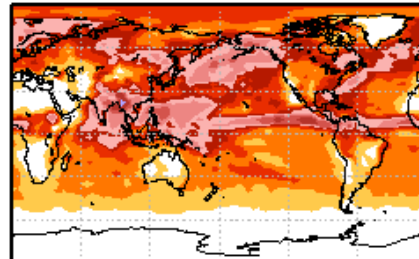


MERRA_v1

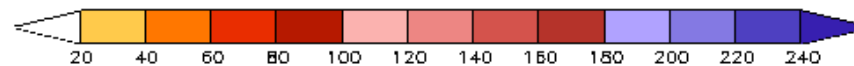
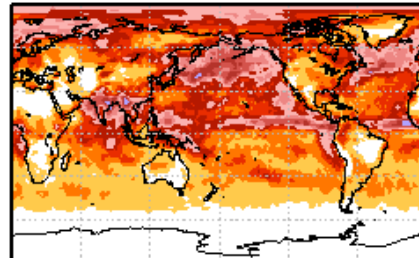
b500_dwndft_01: Mean:46.2474 Std: 33.8408



ERA-40: Mean:56.9487 Std: 37.5846



JRA-25: Mean:52.5086 Std: 37.3462

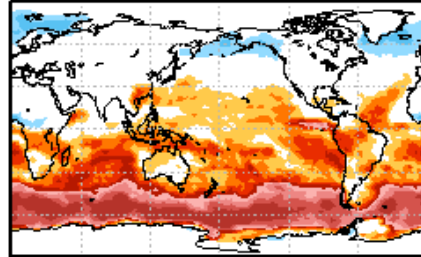


2° MERRA tests

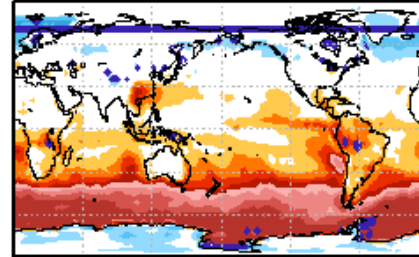
January 2001 Net CRF (Wm^{-2})

MERRA_v0

MERRA RPSW: Mean:55.7023 Std: 46.6719

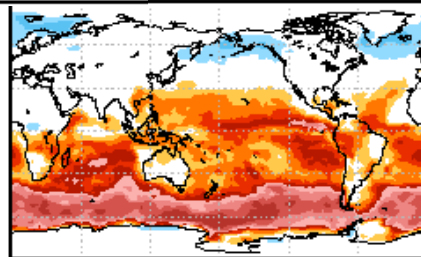


ERBE clim: Mean:-1.95117e+34 Std: nan

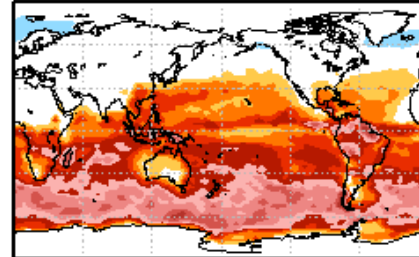


MERRA_v1

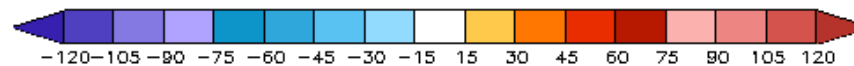
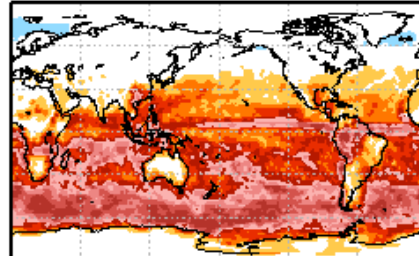
b500_dwndft_01: Mean:51.5345 Std: 40.9919



ERA-40: Mean:40.3475 Std: 33.7739



JRA-25: Mean:44.5155 Std: 36.6421

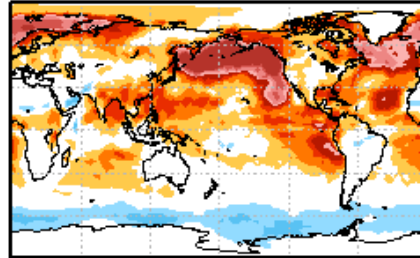


2° MERRA tests

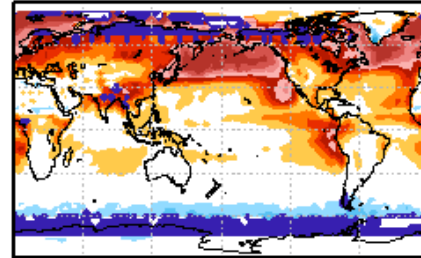
July 2001 Net CRF (Wm^{-2})

MERRA_v0

MERRA RPSW: Mean:57.7809 Std: 48.3868

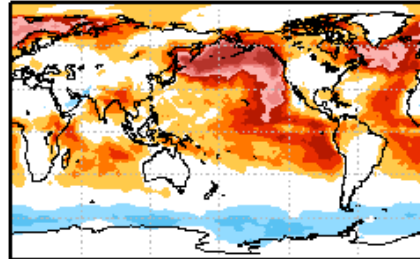


ERBE clim: Mean:-6.1464e+34 Std: nan

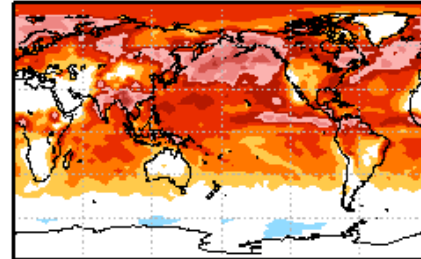


MERRA_v1

MERRA RPSW: Mean:46.2474 Std: 33.8408



ERA-40: Mean:35.6114 Std: 28.1473



JRA-25: Mean:34.807 Std: 32.1736

